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IS 6214 (1971): Phosphors for Cathode Ray Tubes [LITD 4: Electron Tubes and Display Devices]



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“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

SPECIFICATION FOR
PHOSPHORS FOR CATHODE RAY TUBES

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INDIAN STANDARDS INSTITUTION
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NEW DELHI 1

Indian Standard

SPECIFICATION FOR PHOSPHORS FOR CATHODE RAY TUBES

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Indian Standard

SPECIFICATION FOR PHOSPHORS FOR CATHODE RAY TUBES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 26 March 1971, after the draft finalized by the Electron Tubes and Valves Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 This standard deals with the characteristics of different types of phosphors employed in cathode ray tubes.

0.3 Various phosphors proposed in this standard are generally based on internationally accepted commercial phosphors. They conform closely to the characteristics of JEDEC (Joint Electron Device Engineering Council of Electronic Industries Association, USA) Phosphors. The CIE Coordinates as well as SED Curves (Special Energy Distribution) generally conform to the accepted interpretation of Commission Internationale de l'Eclairage (CIE).

0.4 At present six types of phosphor are covered in this standard. Further sheets will be added to this standard as amendments covering new types of phosphors, as and when such phosphors are introduced in the country.

0.5 This standard is one of a series of Indian Standards on cathode ray tubes. A list of standards so far prepared on electron tubes is given on page 12.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the characteristics of different types of phosphors used for cathode ray tubes.

2. TERMINOLOGY

2.1 For the purpose of this standard, the terms

and definition covered in IS : 1885 (Part IV/Sec 4)-1970† shall apply.

3. CHARACTERISTICS OF PHOSPHORS

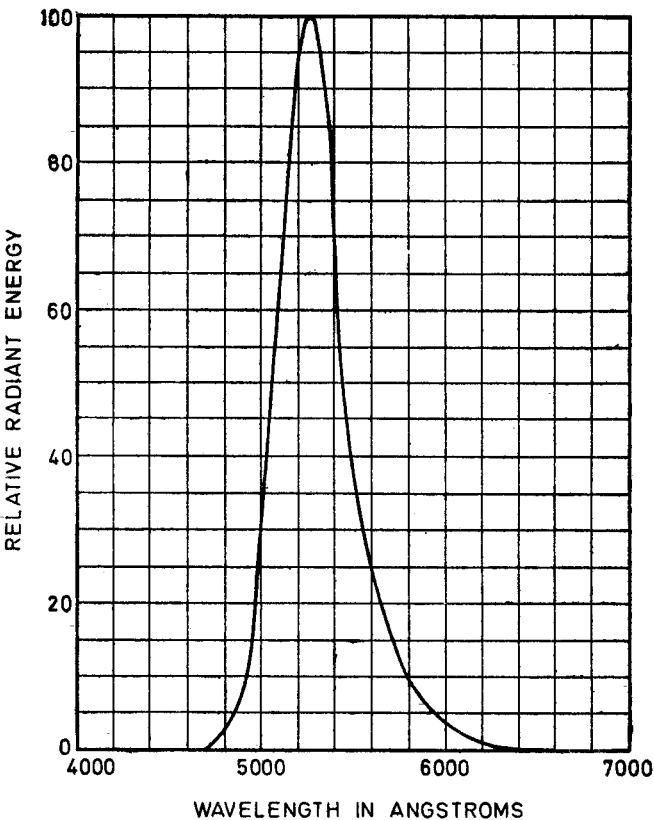
3.1 The characteristics of different types of phosphors are given in Sheets I to VI.

*Rules for rounding off numerical values (*revised*).

†Electrotechnical vocabulary: Part IV Electron tubes and valves, Section 4 Cathode ray tubes.

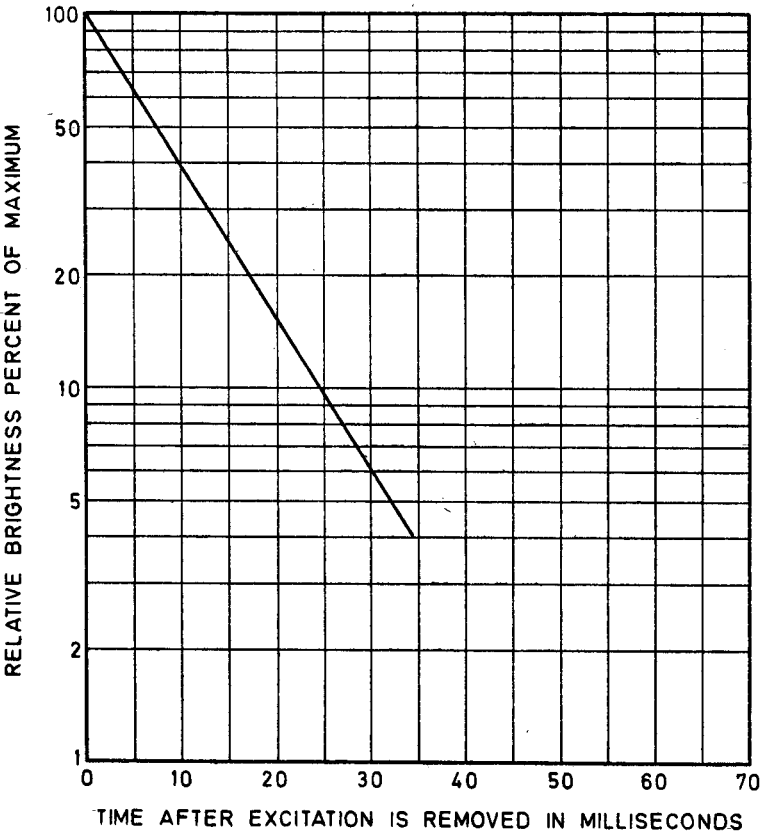
SHEET NO. 1

CHARACTERISTICS OF PHOSPHOR TYPE P1



Fluorescence	Yellowish green
Phosphorescence	Yellowish green
CIE Coordinates	$x = 0.218, y = 0.712$
Spectral Energy Distribution (SED) Curve	Fig. 1
Persistence	Medium
	Fig. 2
Application	Oscilloscope and radar

FIG. 1 SPECTRAL ENERGY DISTRIBUTION CHARACTERISTIC OF PHOSPHOR P1



NOTE — This characteristic is obtained at anode voltage 3.0 kV and anode current 25 μ A.

FIG. 2 PERSISTENCE CHARACTERISTIC OF PHOSPHOR P1

SHEET NO. II

CHARACTERISTICS OF PHOSPHOR TYPE P4

Fluorescence	White
Phosphorescence	White
CIE Coordinates	$x = 0.270$ $y = 0.300$ } (11 000°K)
Spectral Energy Distribution (SED) Curve	Fig. 1
Persistence Characteristics	Medium, short Fig. 2A and 2B
Application	Direct view television

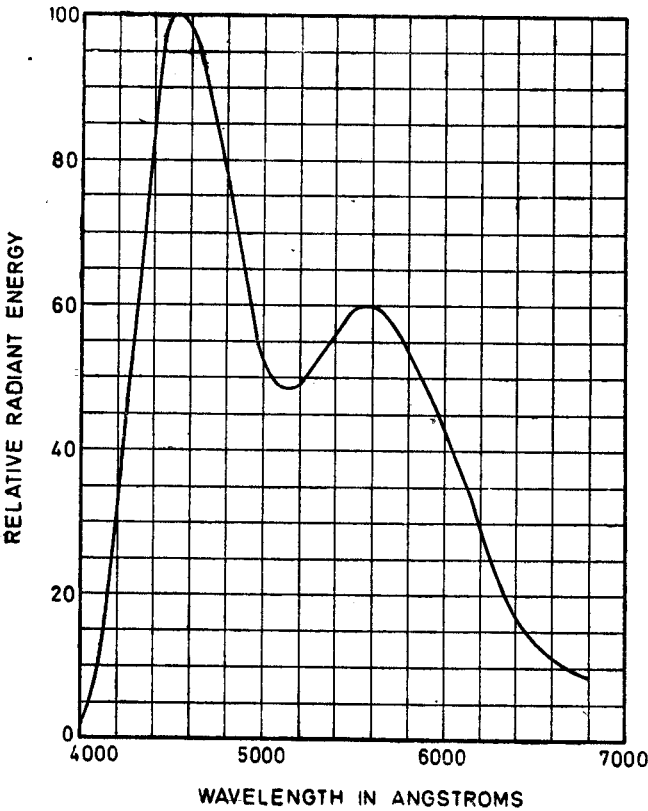
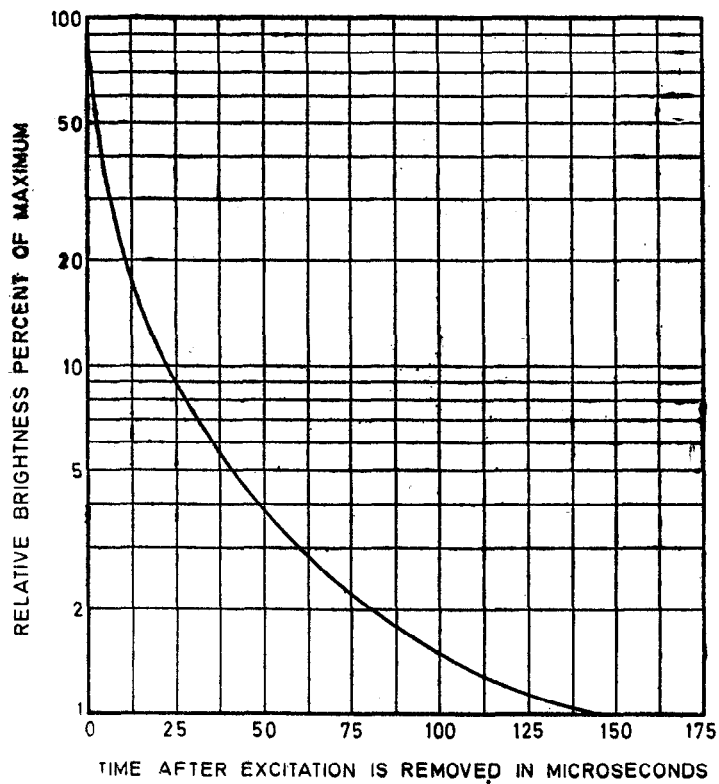
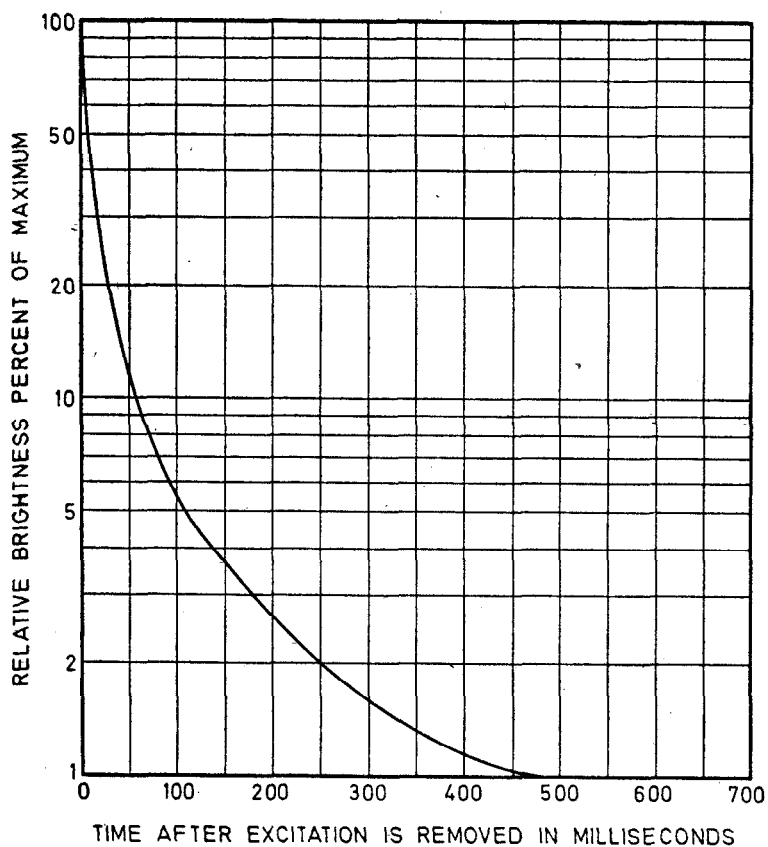


FIG. 1 SPECTRAL ENERGY DISTRIBUTION CHARACTERISTIC OF PHOSPHOR P4



NOTE — This characteristic is obtained at anode voltage 12 kV and anode current 10 μ A.
2A Blue Component



NOTE — This characteristic is obtained at anode voltage 12 kV and anode current 10 μ A.
2B Yellow Component

FIG. 2 PERSISTENCE CHARACTERISTICS OF PHOSPHOR P4

SHEET NO. III

CHARACTERISTICS OF PHOSPHOR TYPE P7*

Fluorescence

White

Phosphorescence

Yellowish green

CIE Coordinates:

Purplish blue component

 $x = 0.151, y = 0.032$

Yellowish green component

 $x = 0.357, y = 0.537$

Simultaneous excitation of blue phosphor and yellow phosphor produces white (9600°K) having coordinates

 $x = 0.278, y = 0.310$

Spectral Energy Distribution (SED) Curve

Persistence

Fig. 1

Purplish blue component

Medium, short

Yellowish green component

Long

Fig. 2A and 2B

Application

Oscilloscope and radar

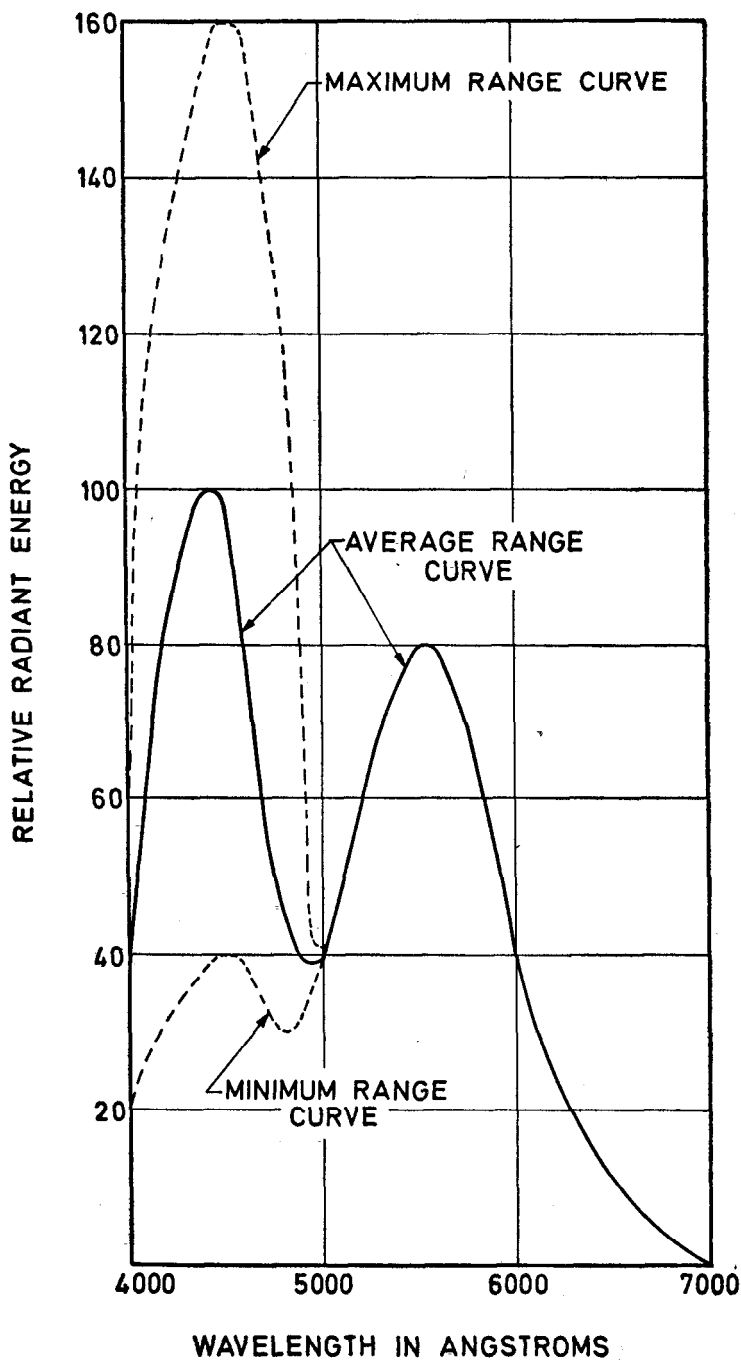
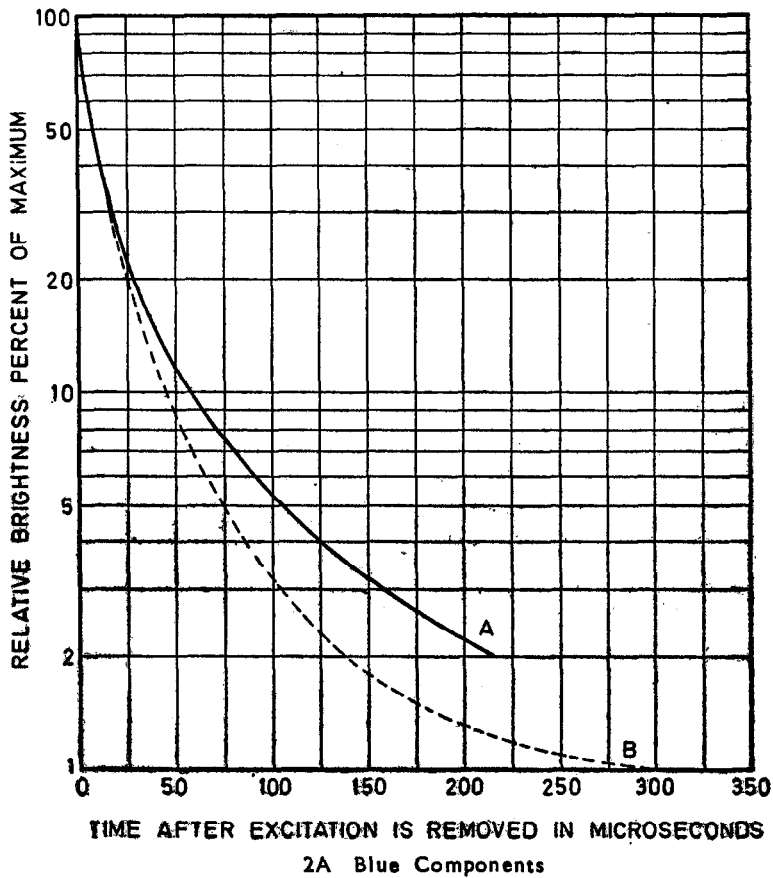


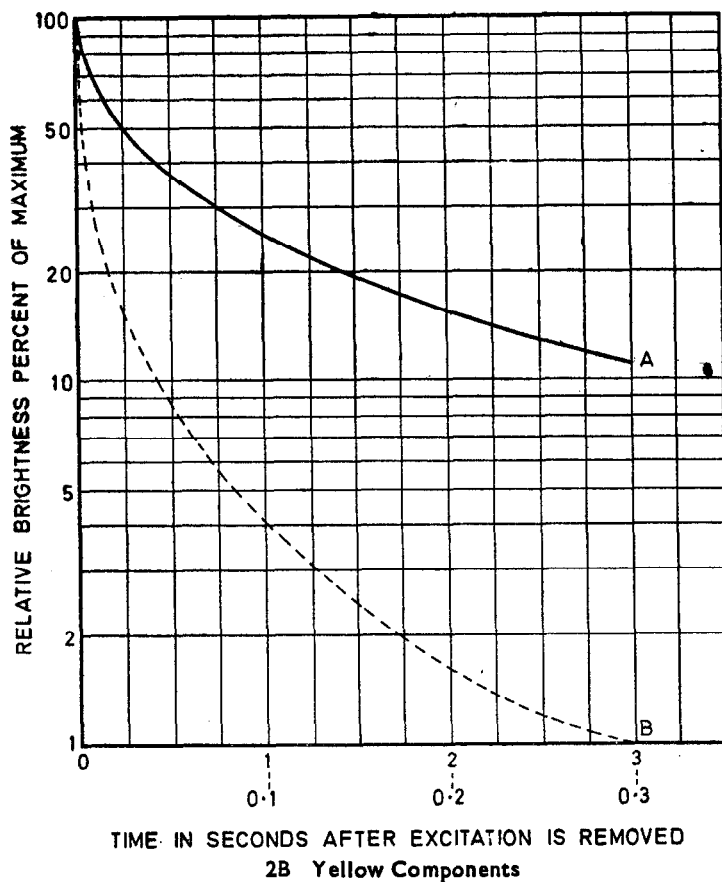
FIG. 1 SPECTRAL ENERGY DISTRIBUTION CHARACTERISTIC OF PHOSPHOR P7

*This is a composite (double layer) phosphor.



NOTE — These characteristics are obtained at anode voltage 3 kV and at the following anode currents:

- a) Anode current $1.7 \mu\text{A}$ (curve A), and
- b) Anode current $17 \mu\text{A}$ (curve B).



NOTE 1 — This characteristic is obtained at anode voltage 3 kV and anode current $1.5 \mu\text{A}$.

NOTE 2 — A is the curve on the expanded time scale and B is the curve on the normal scale.

FIG. 2 PERSISTENCE CHARACTERISTIC OF PHOSPHOR P7

SHEET NO. IV
CHARACTERISTICS OF PHOSPHOR TYPE P 11

Fluorescence	Blue
Phosphorescence	Blue
CIE Coordinates	$x = 0.139$ $y = 0.148$
Spectral Energy Distribution (SED) Curve	Fig. 1
Persistence	Medium, short Fig. 2
Application	Oscilloscope

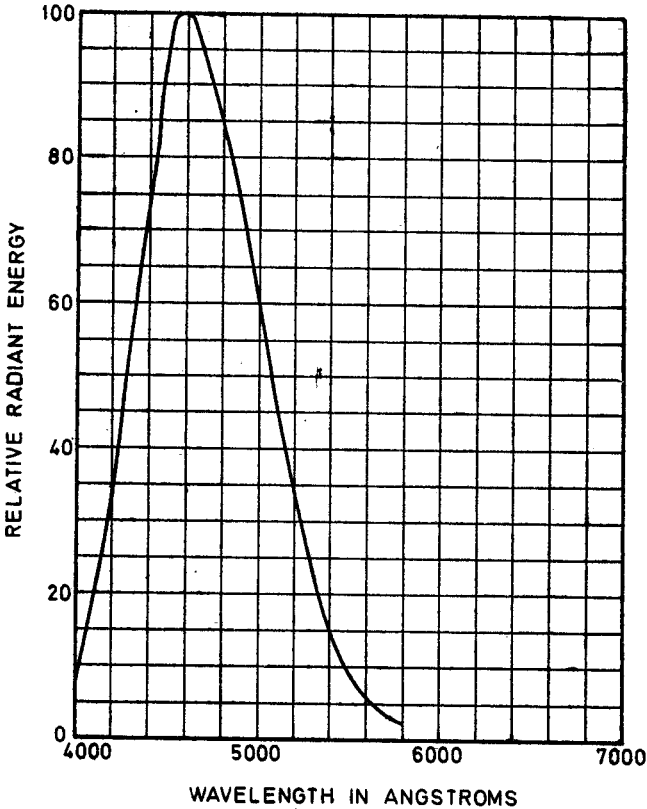


FIG. 1 SPECTRAL ENERGY DISTRIBUTION OF PHOSPHOR P11

NOTE — These characteristics are obtained at anode voltage 3 kV and at the following anode currents:
a) Anode current 2.5 μ A (curve A),
and
b) Anode current 25 μ A (curve B).

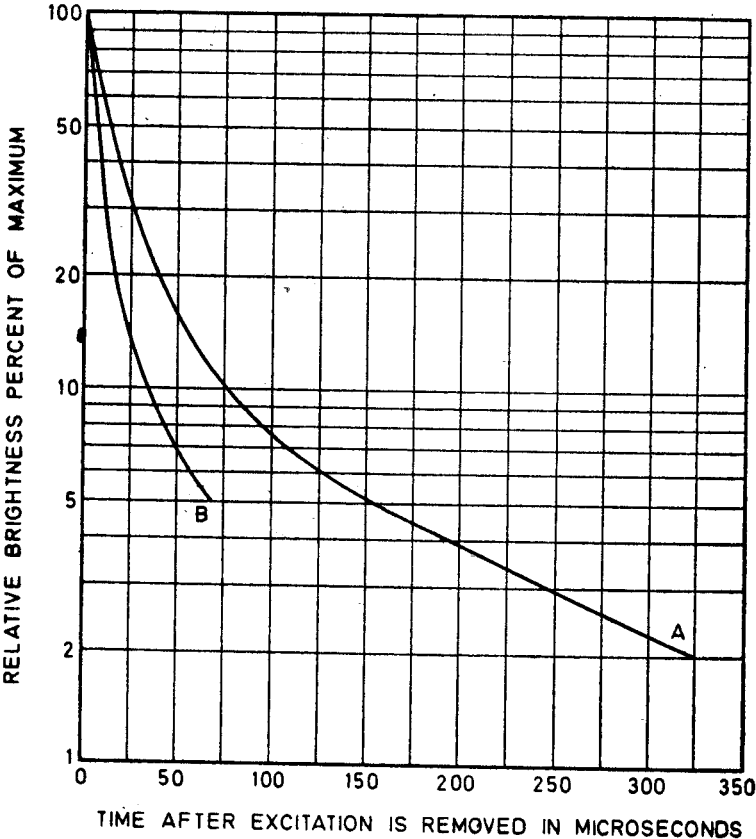
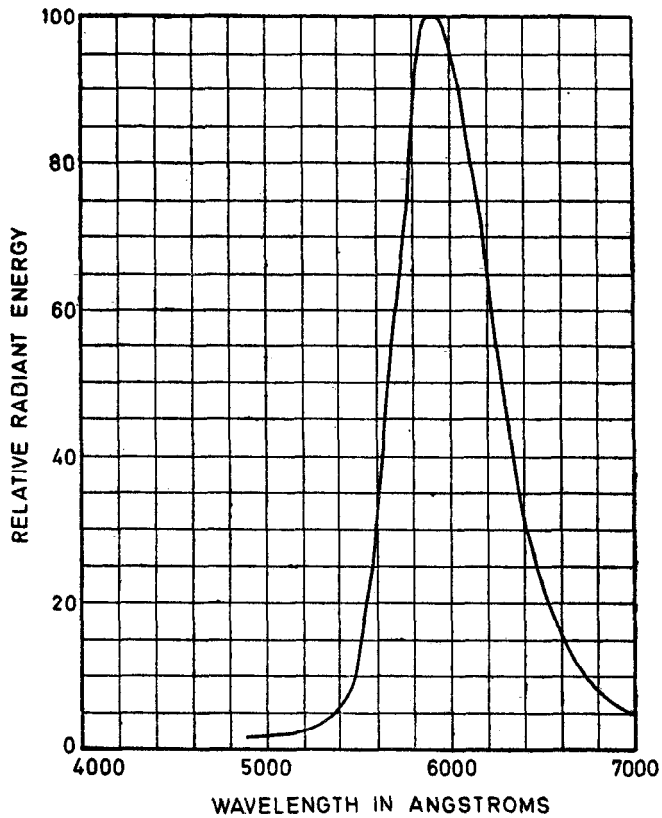


FIG. 2 PERSISTENCE CHARACTERISTIC OF PHOSPHOR P11

SHEET NO. V

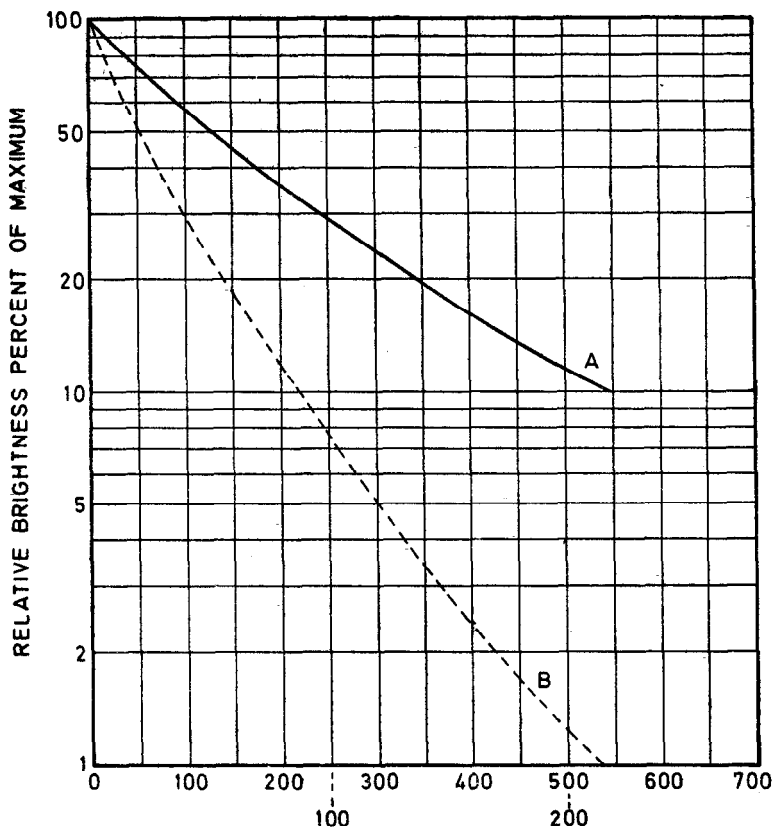
CHARACTERISTICS OF PHOSPHOR TYPE P 19



Fluorescence
Phosphorescence
CIE Coordinates
Spectral Energy
Distribution
(SED) Curve
Persistence
Application

Orange
Orange
 $x = 0.572$
 $y = 0.422$
Fig. 1
Long
Fig. 2
Radar

FIG. 1 SPECTRAL ENERGY DISTRIBUTION OF PHOSPHOR P19



NOTE 1 — This characteristic is obtained at anode voltage 6 kV and anode current 0.1 μ A.

NOTE 2 — Curve A is the curve on the expanded scale and curve B is the curve on the normal scale.

FIG. 2 PERSISTENCE CHARACTERISTIC OF PHOSPHOR P19

SHEET NO. VI

CHARACTERISTICS OF PHOSPHOR TYPE P31

Fluorescence	Green
Phosphorescence	Green
CIE Coordinates:	
Low brightness	$x = 0.245, y = 0.523$
High brightness	$x = 0.206, y = 0.414$
Spectral Energy Distribution (SED) Curve	Fig. 1
Persistence	Medium short Fig. 2
Application	Oscilloscope

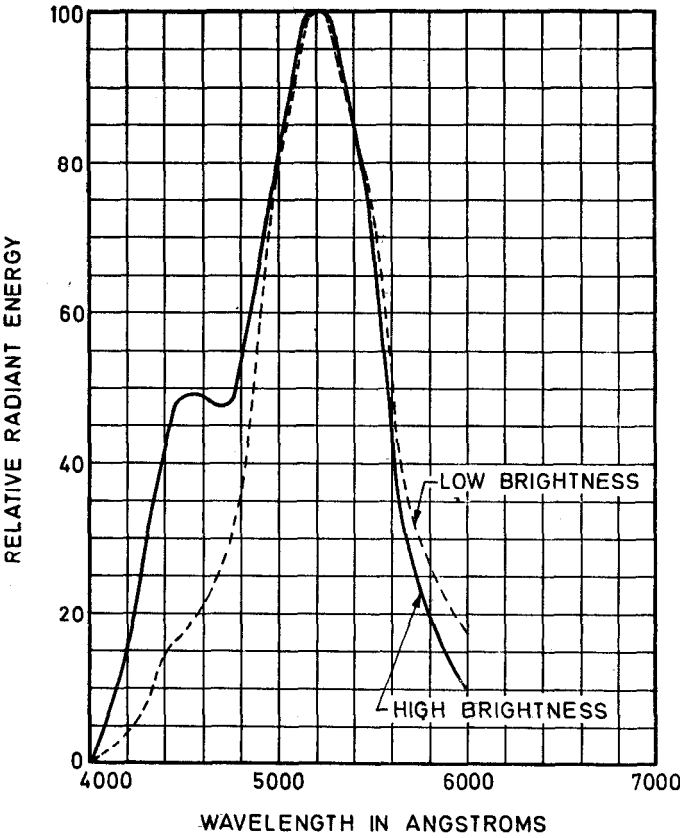
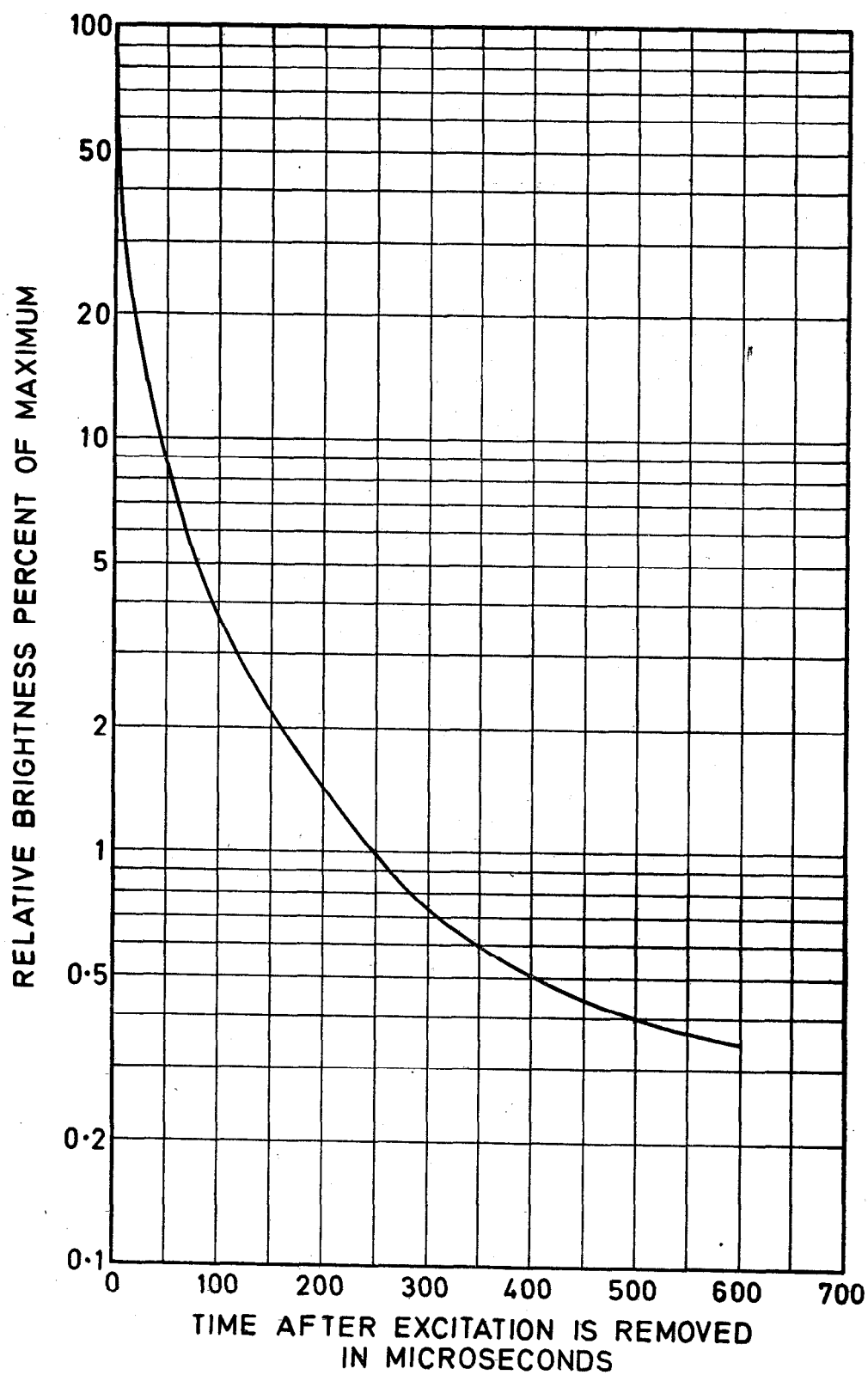


FIG. 1 SPECTRAL ENERGY DISTRIBUTION OF PHOSPHOR P31



NOTE — This characteristic is obtained at anode voltage 3 kV and at anode current 15 μ A.

FIG. 2 PERSISTENCE CHARACTERISTIC OF PHOSPHOR P31

INDIAN STANDARDS

ON

Electron Tubes and Valves

IS:

- 1885 (Part IV/Sec 1)-1965 Electrotechnical vocabulary : Part IV Electron tubes and valves, Section 1 Receiving valves
- 1885 (Part IV/Sec 2)-1965 Electrotechnical vocabulary : Part IV Electron tubes and valves, Section 2 X-ray tubes
- 1885 (Part IV/Sec 3)-1970 Electrotechnical vocabulary : Part IV Electron tubes and valves, Section 3 Microwave tubes
- 1885 (Part IV/Sec 4)-1970 Electrotechnical vocabulary : Part IV Electron tubes and valves, Section 4 Cathode-ray tubes
- 2032 (Part IX)-1969 Graphical symbols used in electrotechnology : Part IX Electron tubes and valves (other than microwave tubes and valves)
- 2032 (Part XIII)-1971 Graphical symbols used in electrotechnology : Part XIII Microwave tubes
- 2597 (Part I)-1964 Code of practice for the use of electronic valves : Part I Commercial receiving valves
- 2597 (Part II)-1967 Code of practice for the use of electronic valves : Part II Special quality receiving valves .
- 2597 (Part III)-1969 Code of practice for the use of electronic valves : Part III Transmitting and industrial valves
- 2597 (Part IV)-1970 Code of practice for the use of electronic valves : Part IV Cathode-ray tubes
- 2597 (Part V)-1971 Code of practice for the use of electronic valves : Part V Rectifiers and thyratrons
- 2612-1965 Recommendation for type approval and sampling procedures for electronic components
- 2684 (Part I)-1964 Dimensions of electronic valves : Part I Miniature 9-pin noval type
- 2684 (Part II)-1965 Dimensions of electronic valves : Part II Miniature 7-pin type
- 2684 (Part III)-1971 Dimensions of electronic valves : Part III Octal base type
- 2684 (Part IV)-1971 Dimensions of electronic valves : Part IV Magnoval base type
- 2684 (Part V)-1972 Dimensions of electronic tubes : Part V Loctal base type
- 3154-1965 X-ray tubes, diagnostic type
- 4096-1967 Method of measurement of optical focal spot size of X-ray tubes
- 4147-1967 Method of measurements on conventional receiving electronic valves
- 4579-1968 Methods of measurements on television picture tubes
- 4697-1968 Methods of measurements on Geiger-Muller counter tubes
- 5323-1969 Letter symbols and abbreviations for electron tubes and valves
- 5627-1970 Methods of measurements on cathode-ray display tubes
- 5840 (Part I)-1970 Dimensions of cathode-ray tubes : Part I Tube outlines
- 5840 (Part II)-1970 Dimensions of cathode-ray tubes : Part II Bases
- 5840 (Part III)-1970 Dimensions of cathode-ray tubes : Part III EHT terminals
- 6134 (Part I/Sec 1)-1971 Methods of measurement on microwave tubes : Part I General measurements, Section 1 General conditions
- 6134 (Part I/Sec 2)-1972 Methods of measurements on microwave tubes : Part I General measurements, Section 2 Measurements common to all devices
- 6136-1971 Basic requirements for cathode-ray tubes

PUBLICATIONS OF INDIAN STANDARDS INSTITUTION

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Over 6 500 Indian Standards covering various subjects have been issued so far. Of these, the standards belonging to the Electrotechnical Group fall under the following categories:

Acoustics and accoustical measurement	Insulating materials
Automobile electrical equipment	Insulators and accessories
Batteries	Integrating meters
Cinematographic equipment	Lamps and lamp accessories
Conductors and cables	Lifts and escalators
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Electric welding equipment	Motors and generators
Electrical installations, codes of practice	Nomenclature and symbols
Electrical instruments	Power capacitors
Electron tubes and valves	Power converters
Electronic components	Relays
Electronic equipment	Rotating machinery
Environmental testing procedures	Semiconductor devices
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